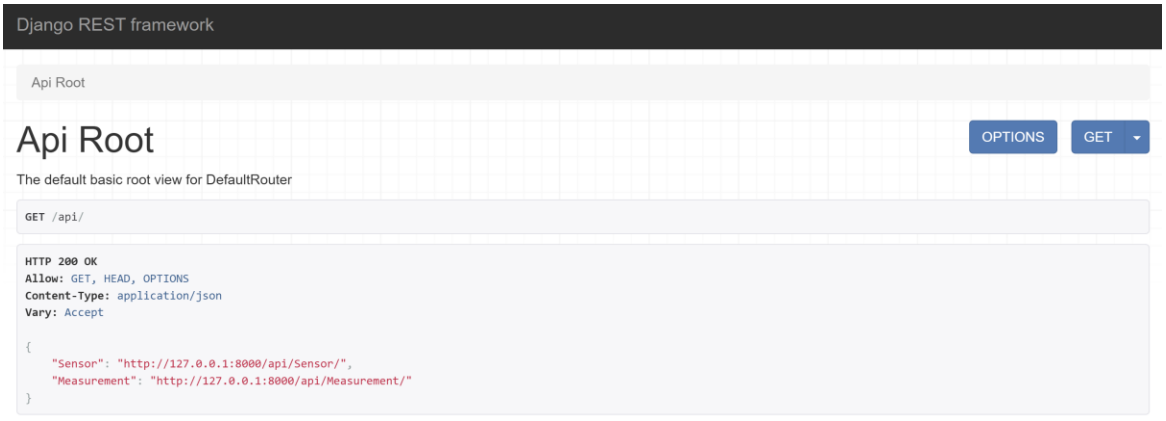
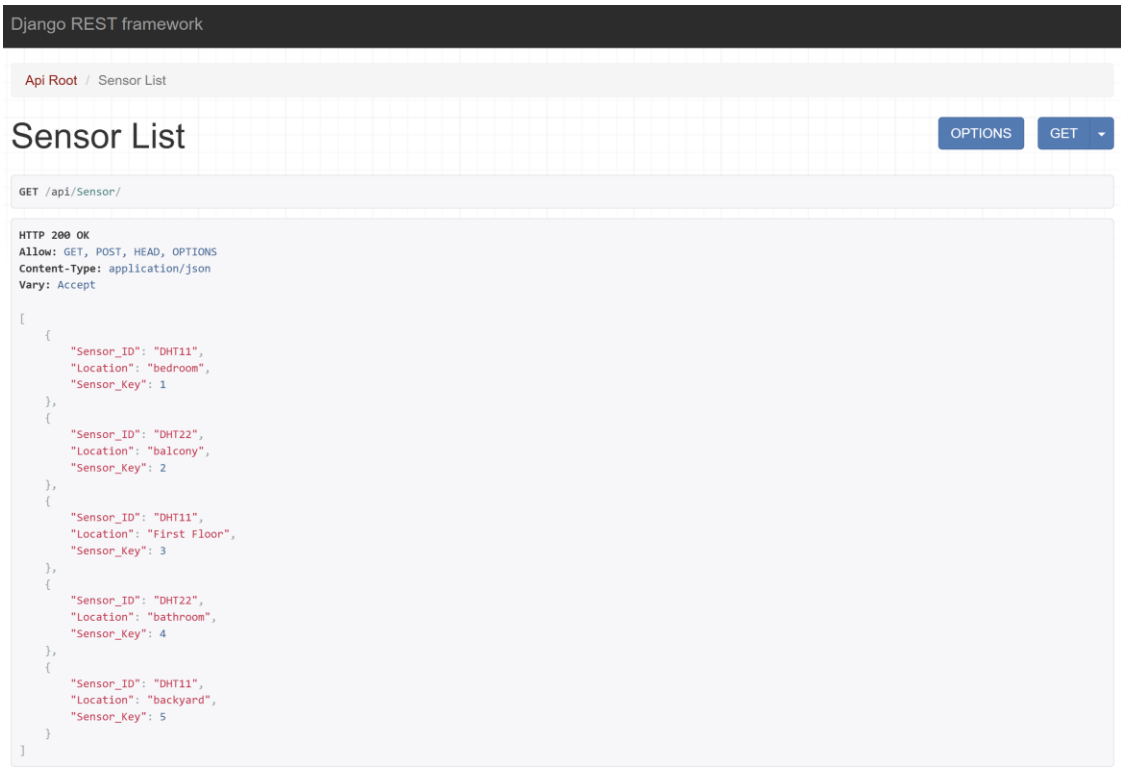
We completed the backend setup and gained a comprehensive understanding of Django. Now, we need to run the entire code using the command **python manage.py runserver** and then open the browser.

Test the API by accessing 127.0.0.1:8000/api





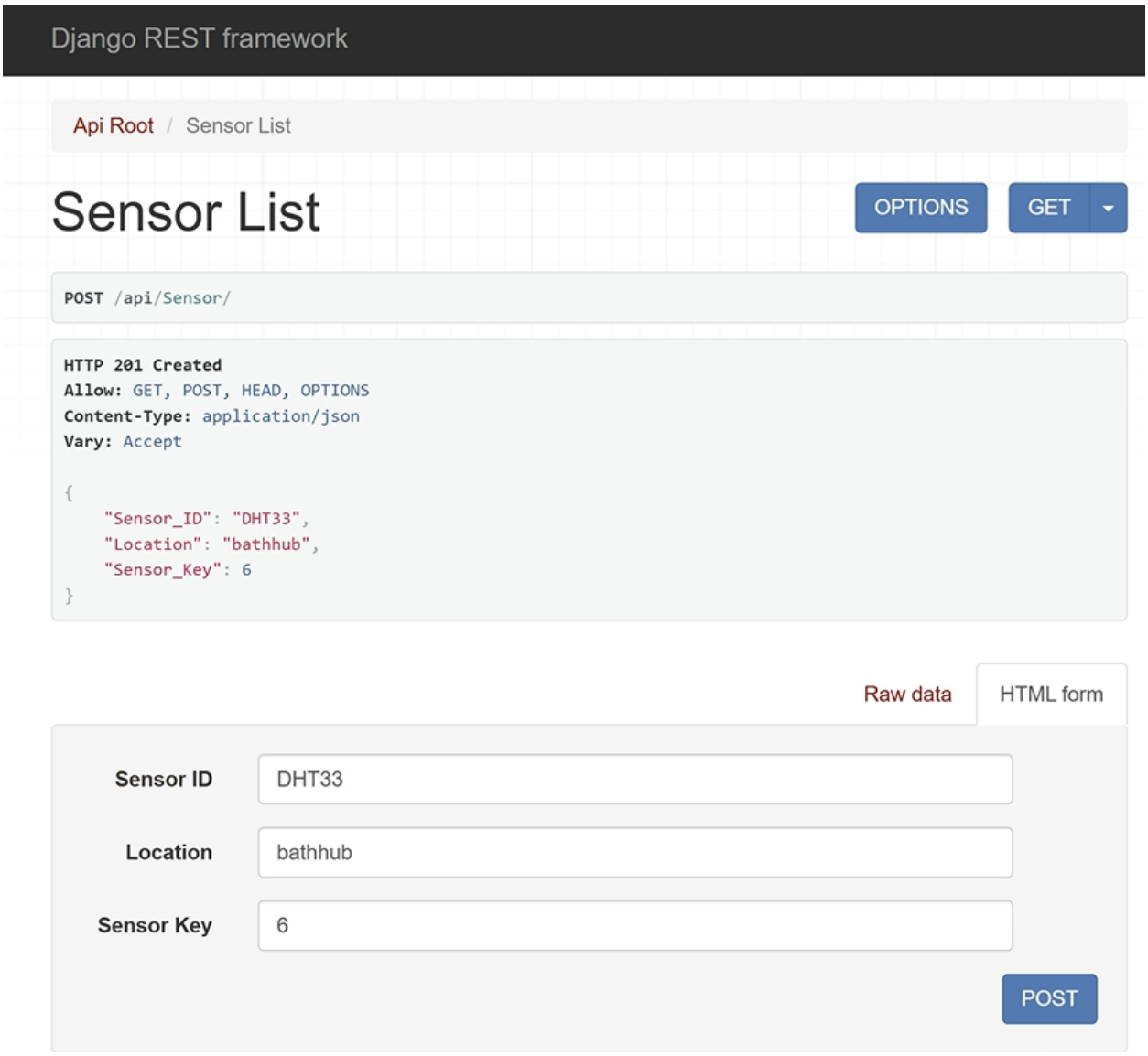
API stands for Application Programming Interface. It provides a standard method and format, and includes common methods such as GET, POST, PUT, DELETE, etc., which means we can perform these operations.

On this page, **127.0.0.1:8000/api/Sensor**, post a new sensor. **At the bottom, there is a form for submitting the new sensor using POST.** Enter the following data:

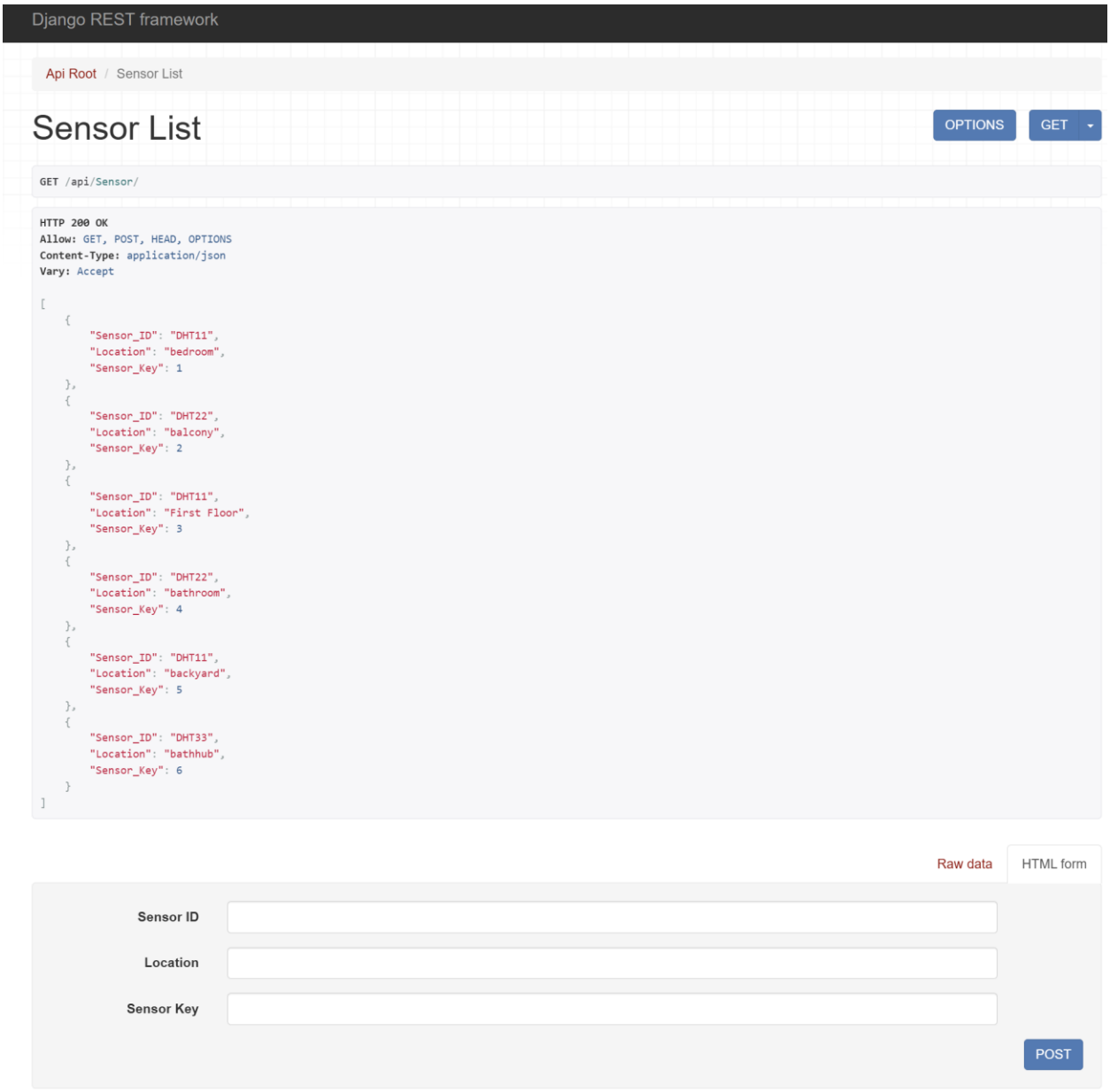
"sensor_key": "6",

"sensor_id": "DHT33",

"location": "bathroom"



After posting, use GET to add the new sensor to the sensor list at http://127.0.0.1:8000/api/Sensor/



These are some basic operations that can be performed through the backend to create, read, update, and delete (CRUD) operations. For example, adding a sensor uses the POST method, and viewing the current sensor list uses the GET method. **Each operation is permanently saved to the MySQL database.**

Frontend (consists of three main themes):

- **HTML: a markup language for formatting pages**
- **CSS: a language for designing pages**
- **JavaScript: a language responsible for frontend logic**

HTML (HyperText Markup Language)

Definition: HTML is the foundational language for building web pages, used to define the structure and content of a web page.

- **Markup Language:** Uses tags to define various elements such as headings, paragraphs, images, and links.
- **Semantic Elements:** HTML5 introduces more semantic tags such as <header>, <footer>, and <article>, making the web page structure clearer and easier for search engines to understand.
- **Static Content:** HTML defines the static content of a web page and does not include any interactive functionality.

Examples of Common Tags:

<!DOCTYPE html>: Declares the document type

<html>: Root element containing the entire document

<head>: Contains metadata about the page, such as the title

<title>: Defines the title of the web page, displayed in the browser tab

<body>: Contains the main content of the web page

<h1>: First-level heading **<p>: Paragraph** **<a>: Hyperlink**

CSS (Cascading Style Sheets)

Definition: CSS is the language used to describe the presentation of HTML elements, defining their appearance and layout.

- **Style Control:** Controls fonts, colors, spacing, and layout, making the web page more beautiful and user-friendly.
- **Cascading:** Styles can cascade, meaning multiple styles can apply to one element, with later styles overriding earlier ones.
- **Responsive Design:** Using media queries, CSS can achieve responsive design, ensuring the web page looks good on different devices.

body: Selects the entire document body, setting the font and background color.

h1: Selects all first-level headings, setting the color and center alignment.

p: Selects all paragraphs, setting the font size and line height.

JavaScript (Scripting Language)

Definition: JavaScript is a high-level programming language used to implement interactive functionality on web pages.

- **Dynamic Interaction:** Can modify HTML and CSS to make web pages dynamic and interactive.
- **Event Handling:** Responds to user actions such as clicks, inputs, and mouse movements.
- **Rich Libraries and Frameworks:** Libraries and frameworks like jQuery, React, and Vue simplify development and improve efficiency.

document.addEventListener('DOMContentLoaded', function() {...}) : Executes a function after the document has finished loading.

document.querySelector('h1').textContent = 'Hello, JavaScript!'; : Finds the first-level heading on the page and changes its text content.

function showAlert() {...} : Defines a function that shows an alert box when called.

Under the myapp directory, in the templates folder, create a frontend folder. Inside the frontend folder, create a public folder, and within public, create a static folder. In the static folder, create two files: script.js and styles.css. Additionally, create an index.html file inside the public folder.

To test it, first open views.py and find

```
def index(request):
    return render(request, 'frontend/public/index.html')
```

Then find settings.py and change STATIC_URL to the following code

```
# Static files (CSS, JavaScript, Images)
# https://docs.djangoproject.com/en/5.0/howto/static-files/

STATIC_URL = '/static/'

STATICFILES_DIRS = [
    os.path.join(BASE_DIR, 'sensors/templates/frontend/public/static'),
]

STATIC_ROOT = os.path.join(BASE_DIR, 'staticfiles')
```

Write a simple HTML file to test, then rerun the entire program using the command **python manage.py runserver**

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Basic HTML Page</title>
</head>
<body>
    <header>
        <h1>Welcome to My Basic HTML Page</h1>
        <nav>
            <ul>
                <li><a href="#home">Home</a></li>
                <li><a href="#about">About</a></li>
                <li><a href="#contact">Contact</a></li>
            </ul>
        </nav>
    </header>

    <main>
        <section id="home">
            <h2>Home</h2>
            <p>This is the home section. Here you can find the latest updates and news.</p>
        </section>

        <section id="about">
            <h2>About</h2>
```

```
        <p>This section contains information about the purpose of this website.</p>
    </section>

    <section id="contact">
        <h2>Contact</h2>
        <p>Feel free to reach out through the contact form below:</p>
        <form>
            <label for="name">Name:</label>
            <input type="text" id="name" name="name">
            <br>
            <label for="email">Email:</label>
            <input type="email" id="email" name="email">
            <br>
            <label for="message">Message:</label>
            <textarea id="message" name="message"></textarea>
            <br>
            <button type="submit">Submit</button>
        </form>
    </section>
</main>

<footer>
    <p>&copy; 2024 My Basic HTML Page. All rights reserved.</p>
</footer>
</body>
</html>
```

```
1    <!DOCTYPE html>
2    <html lang="en">
```

Declare the document type: **Define the current document as HTML5.**

Root element: **Start the HTML document's root element, with lang="en" specifying the document's language as English.**

```
3    <head>
4        <meta charset="UTF-8">
5        <meta name="viewport" content="width=device-width, initial-scale=1.0">
6        <title>Basic HTML Page</title>
7    </head>
```

<head>: Head section containing metadata about the document, not displayed in the browser.

- **<meta charset="UTF-8">: Defines the document's character encoding as UTF-8, supporting nearly all language characters.**
- **<meta name="viewport" content="width=device-width, initial-scale=1.0">: Sets the viewport properties, ensuring the page displays correctly on mobile devices with a width matching the device's width and an initial scale of 1.**
- **<title>Basic HTML Page</title>: Defines the webpage's title, displayed in the browser tab.**

</head>: End of the head section.

```
<body>
    <header>
        <h1>Welcome to My Basic HTML Page</h1>
        <nav>
            <ul>
                <li><a href="#home">Home</a></li>
                <li><a href="#about">About</a></li>
                <li><a href="#contact">Contact</a></li>
            </ul>
        </nav>
    </header>

    <main>
        <section id="home">
            <h2>Home</h2>
            <p>This is the home section. Here you can find the latest updates and news.</p>
        </section>

        <section id="about">
            <h2>About</h2>
            <p>This section contains information about the purpose of this website.</p>
        </section>

        <section id="contact">
            <h2>Contact</h2>
            <p>Feel free to reach out through the contact form below:</p>
            <form>
                <label for="name">Name:</label>
                <input type="text" id="name" name="name">
                <br>
                <label for="email">Email:</label>
                <input type="email" id="email" name="email">
                <br>
                <label for="message">Message:</label>
                <textarea id="message" name="message"></textarea>
                <br>
                <button type="submit">Submit</button>
            </form>
        </section>
    </main>

    <footer>
        <p>&copy; 2024 My Basic HTML Page. All rights reserved.</p>
    </footer>
</body>
```

<body>: The main section containing the primary content of the webpage, displayed in the browser.

<header>: The header section containing the top content of the webpage, such as the title and navigation menu.

- **<h1>Welcome to My Basic HTML Page</h1>: Defines the main heading of the webpage, displaying the welcome text**
- **<nav>: Defines the navigation area, containing an unordered list (<ul>) with three list items (<li>), each containing a hyperlink (<a>) linking to different parts of the page (#home, #about, #contact).**

</header>: End of the header section.

<main>: Contains the main information of the webpage, divided into three sections (<section>)

- **<section id="home">:**
  - **<h2>Home</h2>: Second-level heading, labeled as the "Home" section.**
  - ** This is the home section. Here you can find the latest updates and news. : Paragraph describing the content of the "Home" section.**

- **<section id="about">:**
  - **<h2>About</h2>: Second-level heading, labeled as the "About" section.**
  - ** This section contains information about the purpose of this website. : Paragraph describing the content of the "About" section.**

- **<section id="contact">:**
  - **<h2>Contact</h2>: Second-level heading, labeled as the "Contact" section.**
  - ** Feel free to reach out through the contact form below: : Paragraph describing the content of the "Contact" section.**

  - **<form>: Defines a form containing user input and submission elements.**

    - **<label for="name">Name:</label>: Label describing the next input field as "Name".**
    - **<input type="text" id="name" name="name">: Text input field allowing users to enter their name.**
    - **
: Line break.**
    - **<label for="email">Email:</label>: Label describing the next input field as "Email".**
    - **<input type="email" id="email" name="email">: Email input field allowing users to enter their email address.**
    - **
: Line break.**
    - **<label for="message">Message:</label>: Label describing the next textarea as "Message".**
    - **<textarea id="message" name="message"></textarea>: Multiline text input area allowing users to enter their message.**
    - **
: Line break.**

        - **<button type="submit">Submit</button>: Submit button that submits the form content when clicked.**
    - **</form>: End of the form.**

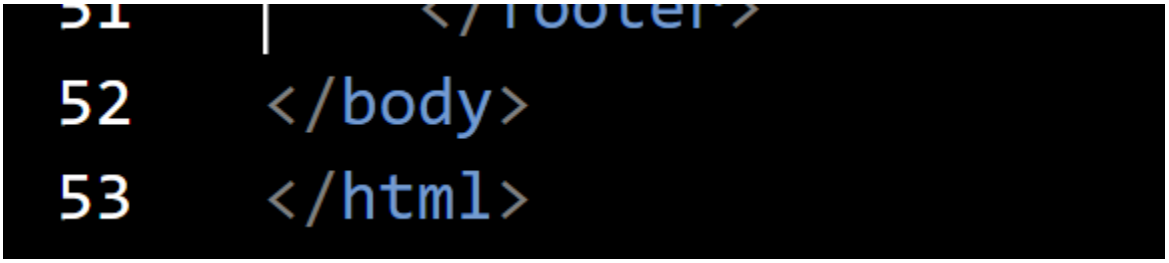
- **</section>: End of the section.**

</main>: End of the main section.

<footer>: The footer section containing the bottom content of the webpage, usually including copyright information.

- ** © 2024 My Basic HTML Page. All rights reserved. : Paragraph displaying copyright information.**

</footer>: End of the footer section.



End the body section, end the HTML document

This HTML file constructs a basic webpage structure, **including a header (with a title and navigation), main content (divided into three sections: Home, About, and Contact), and a footer (with copyright information). By using HTML tags such as <header>, <main>, <section>, and <footer>, the webpage structure becomes clear and semantic, making it easier for users and search engines to understand.**

Result

Welcome to My Basic HTML Page

- Home
- About
- Contact

Home

This is the home section. Here you can find the latest updates and news.

About

This section contains information about the purpose of this website.

Contact

Feel free to reach out through the contact form below:

Name:
Email:
Message:
Submit